

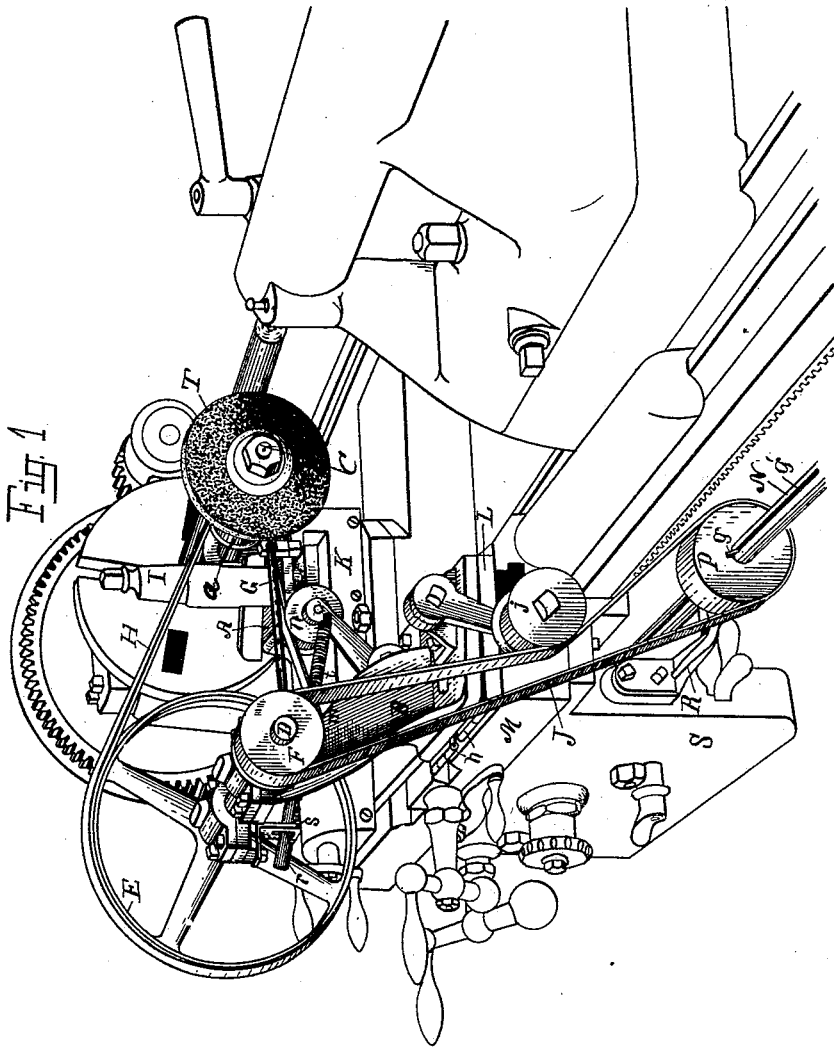
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3 Sheets—Sheet 1.

W. B. CANNON.
GRINDING ATTACHMENT FOR LATHES.

No. 499,905.

Patented June 20, 1893.



Witnesses:

Walter S. Wood
Charles D. Fuller

Inventor.

Warrus B. Cannon
By *Charles D. Fuller*
Att'y.

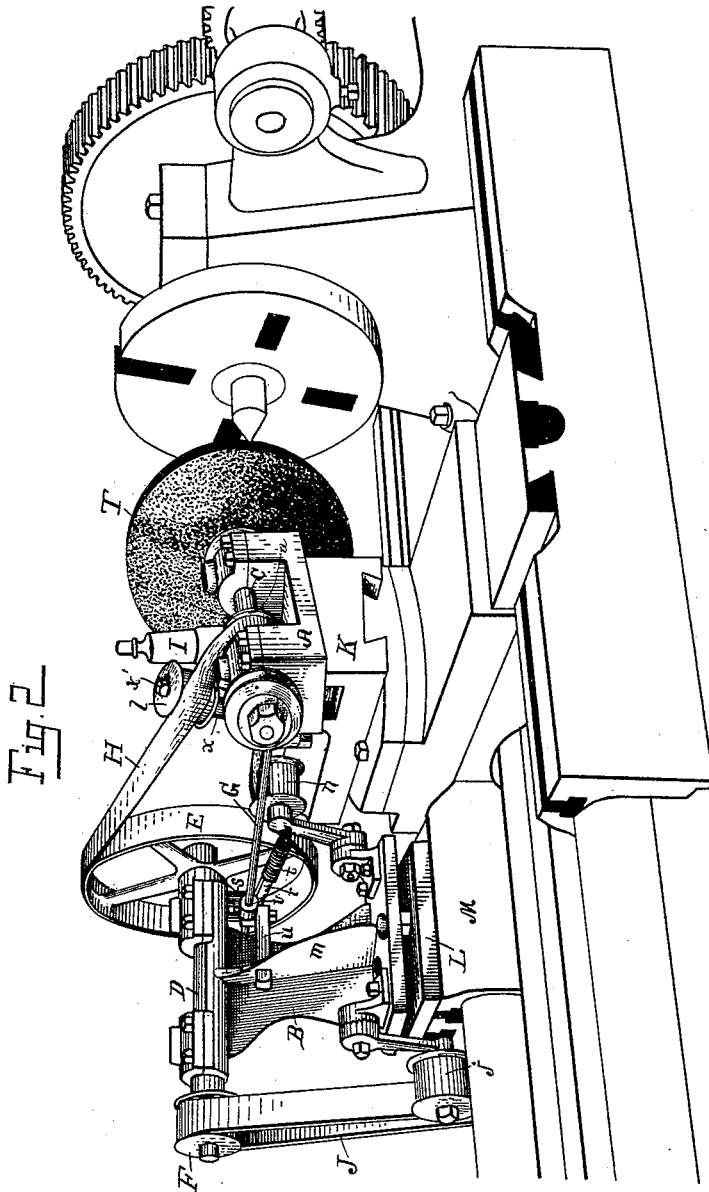
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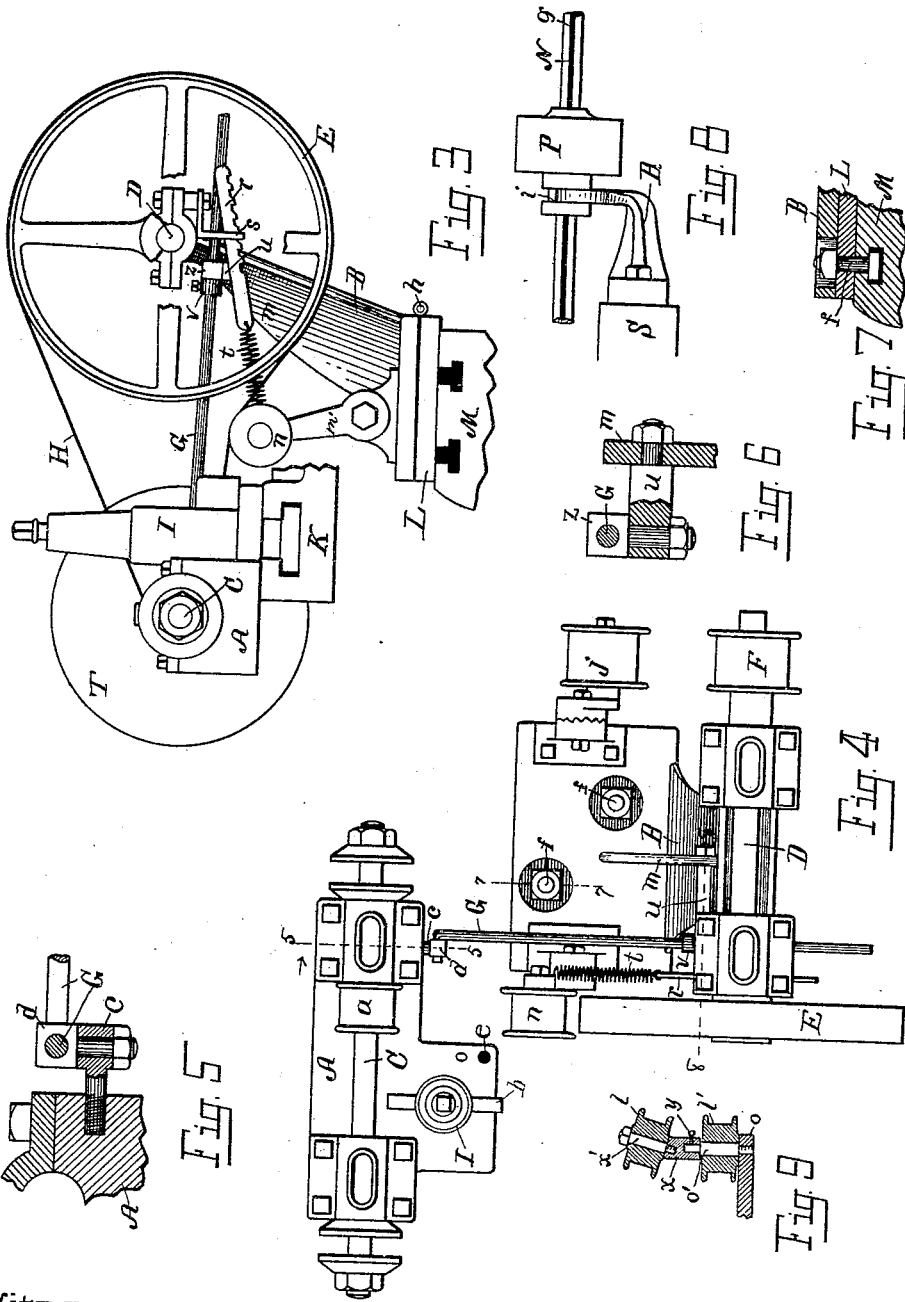
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UNITED STATES PATENT OFFICE

WARREN B. CANNON, OF KALAMAZOO, MICHIGAN, ASSIGNOR TO CHARLES D. FULLER, OF SAME PLACE.

GRINDING ATTACHMENT FOR LATHES.

SPECIFICATION forming part of Letters Patent No. 499,905, dated June 20, 1893.

Application filed May 13, 1892. Serial No. 432,901. (No model.)

To all whom it may concern:

Be it known that I, WARREN B. CANNON, a citizen of the United States, residing at Kalamazoo, in the county of Kalamazoo and State of Michigan, have invented a new and useful Improvement in Grinding Attachments for Lathes, of which the following is a specification.

The object of this invention is to provide a grinding device that can be attached to any ordinary iron lathe and to drive it directly from the feed shaft of the lathe without the use of over-hanging counter-shafts, and to so construct this device that it can be readily adjusted to grind any of the different kinds of work in the lathe. I attain these objects by the devices illustrated in the accompanying drawings in which—

Figure 1 is a perspective view showing this invention attached to a lathe, looking at the lathe from the side on which the operator is at work. Fig. 2 is a perspective view looking at this device from the opposite side of the lathe to which it is shown in Fig. 1. Fig. 3 is an enlarged detail, being an end elevation of the grinding wheel, arbor and arbor-stand as attached to the lathe, the tool-post and the pulley and belt for driving the grinding wheel, and also the standard for holding the grinding pulley. Fig. 4 is an enlarged detail, giving a plan view of the grinding arbor with the grinding wheels removed, the several pulleys used to drive the arbor, and the standards used to support these parts and connect them to a lathe. Fig. 5; is an enlarged detail, being a sectional view on line 5—5 of Fig. 4. Fig. 6 is an enlarged detail, being a sectional view on line 8—8 of Fig. 4. Fig. 7 is an enlarged detail, being a sectional view on line 7—7 of Fig. 4. Fig. 8 is an enlarged detail, showing the manner of attaching the first driving pulley to the feed shaft of the lathe and Fig. 9 is a sectional view, through the center of the idler pulleys for guiding the arbor belt.

A whole lathe is not shown in the drawings, only enough to show the manner of attaching and the relations of the devices comprising this invention, to a lathe.

Similar letters refer to similar parts throughout the several views.

The arbor-stand A is made in the usual manner; to have boxes or bearings for the grinding arbor to run in. Its base is made with a hole suitable for the tool-post of the lathe to go through. In this manner the arbor-stand A is made to pivot to swing or revolve on the tool-post, to bring the arbor and grinding wheels at different angles with the lathe, in order to do any kind of work it may be desired to do. The stand is held securely in position, when set in the proper place for work, by means of a wedge *b*, inserted in the tool-post in the place where the lathe tools are used. The main frame B is hinged at its outer lower side, to the plate L, by means of a hinge *h* and the plate L is bolted on top of the carriage of the lathe and secured rigidly thereto, while the upper main part of frame B is free to swing forward or backward to and from the center of the lathe. The upper part of this main frame B, has boxes or bearings to receive the counter-shaft D. The grinding arbor C is made to run in the bearings or boxes on the stand A and have suitable collars and nuts on each end for holding the grinding wheels, also a pulley *a*, between the bearings, by which it is driven. The countershaft D runs in the boxes or bearings on the upper part of the main frame B, and has on one end, the pulley E which drives the arbor C by means of the belt H. On the other end of the countershaft D, is a small pulley F which is keyed or secured to the countershaft. This pulley F is driven by the driving pulley P by means of the belt J. The driving pulley P, runs on the lathe feed shaft N and is so attached to this shaft, that it is free to slide on the shaft endwise of the same, but is made to revolve with the shaft by means of a key *g*, which key is secured to the pulley P, in a position to run in the groove *g'* in the shaft N. In this manner, the rotation of the feed shaft N, will revolve the pulley P and drive the countershaft D through the pulley F and belt J, and the pulley E, which is keyed to one end of the countershaft D, will drive the grinding arbor A through the pulley *a* and the belt H, at the same time, all these devices are free to ride endwise of the lathe, in the same manner that the carriage and lathe tools can move on the lathe. The pulley P,

is held in position to move endwise in the proper relation to the other devices of this invention, by means of the arm R, which is bolted to the rear end of the lathe apron S.

5 The outer end of this arm R, is made to work on a groove *t*, made in the hub in one side of the pulley P, to carry the pulley along with the apron of the lathe.

The connecting-rod G, is attached to one end of the arbor stand A; this connection is made to form a swivel joint in the block *d'* and the head of the stud *c*, to allow the connecting-rod G to swing both vertically and horizontally, as shown in Fig. 5. The stud *c* has a thread on one end of it to screw into the arbor stand A. The opposite end of the connecting link, or rod G, is connected to the main frame B near its upper part, by means of the arm *u* which is secured to the rib *m* of the main frame at one end, while its opposite end is provided with a swivel block *z* which has a hole through one end to receive the connecting rod G, while its other end has a stud portion which goes through a vertical hole in the arm *u* and has a nut on its lower end to hold it in position, as shown in Fig. 6. The set collar *v*, is made to slide on the connecting link G, and is adapted to set inside and against the block *z* and to hold the main frame B outwardly and away from the arbor-stand. The belt H always pulls the upper part of this main frame B toward the center of the lathe and against this set collar *v*.

The tightener pulley *n*, is for tightening the belt H, and works on the under side of this belt in front of the pulley E. This tightener pulley has an arm *m'* pivoted on the base of the main frame B. The coil spring *t*, connects at one end with the upper part of this arm *m'*; the opposite end of this spring *t*, is connected to one end of the notched lever *r*, and this notched lever passes through a slot in the arm *s*, which arm is bolted at one end to the upper part of the main frame B as shown in Fig. 3. In this manner by pulling endwise on the notched lever *r* and allowing the notches to drop down and engage with the arm *s*, the tension is made to hold the tightener pulley *n*, against the belt H.

50 K is the cross feed carriage of the lathe and can be of any of the various forms used on different lathes for supporting and carrying the tool post. The arbor stand A rests on top of this cross feed carriage K.

55 M is the regular lathe carriage which travels lengthwise of the lathe.

S is the apron or lower part of the carriage M.

60 T is the grinding wheel, which is usually an emery wheel and can be of various forms and sizes, as best adapted to the work it may have to do. It can be put on either end of the arbor C, and as the arbor-stand moves with the cross-feed K, forward and backward across the lathe, so will the grinding wheel also move to bring it in proper position to do its work.

When it is desired to grind at an angle

anything that is beveling or tapering, the grinding wheel T and arbor-stand A can be thrown around on its pivot point or tool-post I, to bring it in any desired position. In this manner the lathe centers can be ground and trued up, as shown in Fig. 2. When the arbor C is swung around in this position, the arbor and pulley *a*, will be running at an angle with the pulley E, and in order to make the belt H run properly, the idler or mule pulleys, *l* *l'*, are placed on the lathe to run on the belt H in a manner to guide the belt and make it run properly on the pulleys E, and *a*, as shown in Fig. 2. These idler or mule pulleys are shown in section in Fig. 9. There is first, a base or stand *o*, which is made to bolt on to the base of the arbor stand A near the tool-post I. This base has a stud *o'*, secured rigidly in one end, on which the pulley *l'* runs. The top of this stud *o'*, where it projects above the pulley *l'* is turned down smaller, to receive the block, *x*. This block, *x*, has a hole in its lower part to receive the upper part of the stud, *o'*, and is secured to the stud by means of a set-screw, *y*, which screws into the block, *x*, and against the stud *o'*. In this manner the block can be turned around on the stud *o'*, and set in any place desired. The upper part of the block, *x*, is made beveling and the pin, *x'*, is screwed into the beveled face of this block at right angles with this face, and the pulley, *l*, is made to run on this pin, *x'*; in this manner, it will be seen that when the block, *x*, is revolved on the stud, *o'*, it will throw this upper idler or mule pulley *l* around to make it come at different angles in relation to the pulleys E and *a*, and with the adjustment thus provided for, this pulley, *l*, can be set in the proper position to guide the belt H to make it run on the pulley *a* at any of the various angles this pulley may be used, while the pulley, *l*, will guide the lower part of the belt H to run properly on the pulley E.

The tightener, *j*, is made similar to the tightener *n*, having a similar arm to revolve upon: which arm is pivoted to swing on the opposite end of the frame B, to that which the tightener, *n*, works on. This tightener *j*, is used to run on the belt, J, to keep that belt of the required tension for doing its work.

The operation is as follows: If the piece to be ground, is a shaft or similar article, the devices comprising this invention are attached to the lathe in a similar manner to that shown in Fig. 4. When the lathe is started, the rotation of the feed shaft N, will cause the grinding wheel to revolve at the proper speed, by means of the various pulleys and belts shown in the drawings and before described. The shaft to be ground can also be rotated at the same time and the grinding wheels adjusted in the proper position to work against the shaft as both are being revolved, and the grinding device with the wheel, can be made to travel lengthwise of the shaft and lathe, by means of the regular feed works of the lathe, in the same manner that the lathe tool

is made to travel, thereby doing regular and active work on the shaft being ground, from one end to the other or as much of it as may be desired. When it is desired to grind on a bevel, as shown in Fig. 2, the arbor-stand A is set at any desired angle to correspond with the bevel to be ground, and the mule or idler pulleys *l*, *l'*, are placed in position to work on the belt H to insure the belt running properly on the pulley E and *a*, and the grinding-wheel can be moved either forward or backward, sidewise or in any desired way that a lathe tool can be operated, viz: either by means of the regular lathe feed or the hand cranks on the lathe apron and carriage. When the grinding wheel T, is moved forward or backward across the lathe, the pulleys *a* and E, will always be kept at the proper distance from each other by means of the connecting rod or link G, as before described; the connecting link drawing the pulley E, forward and backward across the lathe to correspond to the movement of the pulley, *e*. If necessary, the tightener pulley, *j*, could be held against the belt J, by means of a spring in the arm of this tightener pulley similar to that in the tightener pulley *n*, thereby producing a nearly equal tension on the belt J, at all times when the frame B, and pulley F, are swinging forward and backward. This grinding device is particularly adapted to the grinding and turning up of lathe centers as shown in Fig. 2.

I am aware that grinding-wheels have been used and operated on lathe carriages before, and I do not broadly claim this principle.

What I do claim, and desire to secure by Letters Patent, is—

1. In a grinding attachment for lathes, in which the arbor-stand for the grinding wheel is attached to the lathe in a position to grind between the lathe centers, means for rotating the grinding arbor from a driving device located on the regular feed shaft of the lathe substantially as shown.

2. In a grinding attachment for iron lathes a grinding stand and arbor attached to the lathe in a position to grind between the lathe centers, a pulley on the grinding arbor, and a pulley on the regular feed shaft of the lathe together with suitable belting running between the said two pulleys to transmit power from the said feed shaft to the said grinding arbor substantially as shown.

3. In a grinding attachment for lathes the grinding arbor mounted on a stand and attached to the lathe in such a manner that it can be moved endwise or crosswise of the lathe while the grinding is being done, and means for rotating the grinding wheel and arbor from the same shaft that feeds the lathe carriage and apron forward and backward on the lathe substantially as specified.

4. In a grinding attachment for lathes, the arbor-stand mounted on the cross-feed carriage of the lathe in combination with the pulley on the feed-shaft for driving the grinding

arbor and an intermediate countershaft and pulleys, between the driving pulley on the feed-shaft and the pulley on the arbor for increasing the speed of the said arbor above what it is on the feed-shaft, substantially as specified.

5. In a grinding attachment for lathes, the arbor stand for the grinding wheel mounted on a cross feed carriage in combination with the counter-shaft D, mounted in bearings on a frame which rides on the carriage M, means for rotating the grinding arbor which is in the grinding stand, from the counter-shaft D and means for rotating the counter-shaft D, substantially as and for the purposes specified.

6. In a grinding attachment for lathes, the grinding arbor adapted to move forward and backward with the cross feed of the lathe in combination with the countershaft D, also adapted to be moved forward and backward in unison with the said grinding arbor. The counter-shaft D, mounted in bearings in the upper part of a frame B and the said frame B hinged at its lower part on the lathe in such a manner as to allow its upper part to swing forward and backward, the belt H for transmitting power from the counter-shaft D to the grinding arbor and means for holding the counter-shaft D at the proper distance from the grinding arbor to keep a uniform tension on the belt H when the grinding arbor is moved forward and backward, substantially as and for the purposes specified.

7. In combination with the arbor C and the arbor-stand A, the counter-shaft D, frame B, and connecting rod or link G, for holding the main frame B at the proper distance away from the arbor-stand A, substantially as specified.

8. The combination of the arbor-stand A, frame B, connecting-rod or link G, swivel joint or block *d*, on one end of the connecting rod G and arm *u*, on the other end of the connecting-rod G, substantially as and for the purposes specified.

9. In a grinding attachment for lathes, an arbor-stand A adapted to pivot and swing on the tool-post of the cross-feed carriage and the belt H and the pulleys E and *a* in combination with mule pulleys *l*, and *l'*, for properly guiding the belt and directing it to run on the pulleys E, and *a*, substantially as specified.

10. In a grinding attachment for lathes, the combination of the mule pulley *l'*, running on the stud *o'*, the block X, fastened adjustably to the upper part of the stud *o'*, and the mule pulley *l*, running on the pin *x'*. Said pin projecting from the upper or beveled face of the block *x*, substantially as and for the purposes specified.

11. In a grinding attachment for lathes, the combination and arrangement of the pulleys E, and *a*, belt H, tightener *n*, spring *t*, and notched lever *r*, substantially as and for the purposes specified.

12. In a grinding attachment for lathes, the main driving pulley P, located on the feed-shaft N, in combination with the arm R, said arm having one end bolted to the feed-carriage or apron while its opposite end works in a groove ϵ , in the hub and the pulley P, to control the endwise movement of the pulley P, substantially as and for the purposes specified.

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Witnesses:

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